REMARKS

Claims 15, 16, 19 and 20 are now pending in the present application, with claim 16 being independent. Claims 15, 16, 19 and 20 have been amended. No new matter has been added.

Rejections under 35 USC §112

The Examiner rejected claims 15, 16, 19 and 20 under 35 USC §112, second paragraph. Applicant has amended independent claim 16 to overcome these rejections. Applicant now believes that these rejections are moot.

Rejections under 35 USC §102/103

The Examiner rejected claims 14-16: (1) under 35 USC §102(b)/103(a) as anticipated by or obvious over Sanderson 4,541,944; and (2) under 35 USC §102(e)/103(a) as anticipated by or obvious over Del Duca et al 5,968,885 or 6,071,870. The Examiner rejected claim 19-20: (3) under 35 USC §103(a) as obvious over Sanderson 4,541,944 or Del Duca et al 5,968,885 or 6,071,870. The Examiner rejected claims 15-16: (4) under 35 USC §102(b)/103(a) as anticipated by or obvious over Scheuing et al 5,681,805 or 5,792,385; and (5) under 35 USC §102(e)/103(a) as anticipated by or obvious over Zhou et al 5,877,133 or Kott et al 6,117,357 or Miracle et al 6,096,098. The Examiner rejected claims 15 and 16: (6) under 35 USC §102(e)/103(a) as anticipated by or obvious over Choy 6,010,994. The Examiner further rejected claims 19-20: (8) under 35 USC §103(a) as obvious over Scheuing et al 5,681,805 or 5,792,385,

or Scialla et al 6,099,587 or 5,997,585 or 5,900,187, or Kott et al 6,117,357, or Miracle et al 6,096,098.

In light of the presently amended claims, Applicant respectfully disagrees. In response the Examiner's rejection, Applicant has amended the claims to incorporate specific limitations directed to the decontamination of a chemical and biological warfare agent. Unlike the present claims that are directed to chemical and biological decontamination, Sanderson '473 and '944, Del Duca et al '885 and '870, Scheuing et al '385 and '805, Zhou et al '137, Kott et al '357, Miracle et al '098, Scialla et al '587, '585, or '187, and Choy et al '994 all apparently relate to cleaning compositions (Sanderson '473 relates to "washing, bleaching, or disinfection" at col. 1, lns. 8-9; Sanderson '944 relates to "cleaning, bleaching or disinfection" at col. 1, lns. 10-11; and Del Duca et al '885 and '870 relate to "pretreater" at col. 1, ln. 6 and col. 1, ln. 9, respectively; Scheuing et al '385 and '805, Zhou et al '137 relate to "bleaching or cleaning applications" at col. 1, lns 62-63, col. 1, lns. 62-63 and col. 1, lns. 65-66, respectively, Kott et al '357 and Miracle et al '098 relate to "laundry, automatic dishwashing and hard surface cleaning compositions" at col. 1, lns. 17-19 and col. 1, lns. 14-16, respectively; Scialla et al '587 relates to a "pretreater" at col. 1, ln. 8, and Scialla et al '585 and '187 relate to "bleaching textiles" at col. 1, ln. 14 and col. 1, ln. 7, respectively; and Choy et al '994 refers to "bleaching and cleaning" at col. 1, lns. 16-17). None of the references disclose or suggest decontamination of a warfare agent on a contaminated surface. As such, the cited references do not teach or suggest the currently claimed invention as defined in the amended claims.

As known in the art, decontamination provides for the removal of disease-producing microorganisms to leave an item safe for further handling (*see* BCCDC Laboratory Services, BC Centre for Disease Control 2003 at page 3, attached). As such, effective decontamination necessitates particular considerations for the safety of the personnel conducting the decontamination, equipment use, time constraints, etc. that are not found in washing, bleaching, disinfection or other cleaning applications.

Accordingly, Applicant requests reconsideration and allowance of claims 15-16 and 19-20, as amended herein. The Examiner is invited to contact the attorney listed below with any questions or other matters to advance the present application.

Respectfully submitted,

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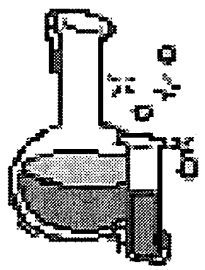

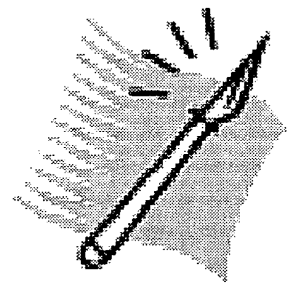

A Guide to

Selection and Use of Disinfectants

BC Centre for Disease Control

2003

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1.0 DEFINITIONS

Antiseptics - chemicals that kill microorganisms on living skin or mucous membranes.

Bactericidal - chemical agents capable of killing bacteria. Similarly agents that are virucidal, fungicidal or sporicidal are agents capable of killing these organisms.

Bacteriostatic - Chemical agents that inhibit the growth of bacteria but do not necessarily kill them.

Cleaning - the physical removal of foreign material, e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms. Cleaning generally removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action. The terms "decontamination" and "sanitation" may be used for this process in certain settings, e.g., central service or dietetics. Cleaning reduces or eliminates the reservoirs of potential pathogenic organisms.

Critical items: instruments and devices that enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganisms. Reprocessing critical items involves meticulous cleaning followed by sterilization.

Decontamination: the removal of disease-producing microorganisms to leave an item safe for further handling.

Disinfection: the inactivation of disease-producing microorganisms. Disinfection does not destroy bacterial spores. Disinfectants are used on inanimate objects in contrast to antiseptics, which are used on living tissue. Disinfection usually involves chemicals, heat or ultraviolet light. The nature of chemical disinfection varies with the type of product used.

High level disinfection: High level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and nonenveloped (non lipid) viruses, but not necessarily bacterial spores. High level disinfectant chemicals (also called chemical sterilants) must be capable of sterilization when contact time is extended. Items must be thoroughly cleaned prior to high level disinfection.

Intermediate level disinfection: Intermediate level disinfectants kill vegetative bacteria, most viruses and most fungi but not resistant bacterial spores.

Low level disinfection: Low level disinfectants kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses (e.g., hepatitis B, C, hantavirus, and HIV). Low level disinfectants do not kill mycobacteria or bacterial spores. Low level disinfectants are typically used to clean environmental surfaces.

Noncritical items: those that either come in contact with only intact skin but not mucous membranes or do not directly contact the patient. Reprocessing of noncritical items involves cleaning and/or low level disinfection.

Sanitation: a process that reduces microorganisms on an inanimate object to a level below that of infectious hazard (e.g., dishes and eating utensils are sanitized).

Semicritical items: devices that come in contact with nonintact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semicritical items involves meticulous cleaning followed preferably by high-level disinfection.

Sterilization: the destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Items should be cleaned thoroughly before effective sterilization can take place.

2.0 SELECTION CRITERIA

Usually disinfectants are "cidal" in that they kill the susceptible potential pathogenic agents. The selection of a disinfectant should be based on the function the disinfectant is expected to perform, not necessarily on a sales pitch or on what you have always used. Ideally, a disinfectant should be broad spectrum (eliminates bacteria, viruses, protozoa, fungi and spores), nonirritating, nontoxic, noncorrosive and inexpensive. Selection decisions should include effectiveness against the potential pathogenic agent, safety to people, impact on equipment, the environment, and expense.

Disinfectant effectiveness depends on many factors. These include:

- Type of contaminating microorganism. Each disinfectant has unique antimicrobial attributes.
- Degree of contamination. This determines the quality of disinfectant required and time of exposure.
- Amount of proteinaceous material present. High protein based materials absorb and neutralize some chemical disinfectants.
- Presence of organic matter and other compounds such as soaps may neutralize some disinfectants.
- Chemical nature of disinfectant. It is important to understand the mode of action in order to select the appropriate disinfectant.
- Concentration and quantity of disinfectant. It is important to choose the proper concentration and quantity of disinfectant that is best suited to each situation.
- Contact time and temperature. Sufficient time and appropriate temperature must be allowed for action of the disinfectant and may depend on the degree of contamination and organic matter load.
- Residual activity and effects on fabric and metal should be considered for specific situations.
- Application temperature, pH and interactions with other compounds must be considered.
- Toxicity to the environment and relative safety to people that may be exposed.
- Cost.

3.0 LOW LEVEL DISINFECTANTS

3.1 Phenolic Disinfectants

Phenol is commonly found in mouthwashes, scrub soaps and surface disinfectants, and is the active ingredient found in household disinfectants (e.g. Lysol, Pine Sol). Phenolic disinfectants are effective against bacteria (especially gram positive bacteria) and enveloped viruses. They are not effective against nonenveloped viruses and spores. These disinfectants maintain their activity in the presence of organic material. This class of compounds is used for decontamination of the hospital environment, including laboratory surfaces, and noncritical medical items. Phenolics are not recommended for semicritical items because of the lack of validated efficacy data for many of the available formulations and because the residual disinfectant on porous materials may cause tissue irritation even when thoroughly rinsed. Phenolic disinfectants are generally safe, but prolonged exposure to the skin may cause irritation. The use of phenolics in nurseries is questioned because of toxicity to infants.

3.2 Quaternary Ammonium Compounds

The quaternary ammonium compounds are widely used as disinfectants but are contraindicated as antiseptics. Their failure as antiseptics on skin and tissue was recognized following several outbreaks of infections associated with their use. There are also reports of healthcare-associated infections associated with contaminated quaternary ammonium compounds used to disinfect patient-care supplies or equipment such as cystoscopes or cardiac catheters. The quaternaries are good cleaning agents but high water hardness and materials such as cotton and gauze pads may make them less microbiocidal because these materials absorb the active ingredients. As with several other disinfectants (e.g., phenolics, iodophors) gram-negative bacteria have been found to survive or grow in these preparations.

Quaternary ammonium (QA) disinfectants contain NH_4^+. The labels often list a form of ammonium chloride (AC) such as alkyl aryl, benzyl, didecyl, dimethyl, ethylbenzyl, octyl or a combination thereof. Benzalconium chloride (BC) is a more tissue friendly QA than AC. QA disinfectants are effective against Gram + and Gram - bacteria, and enveloped viruses.

They are not effective against non-enveloped viruses, fungi and bacterial spores. QA disinfectants carry a very strong positive charge that makes good contact with negatively charged surfaces. This characteristic makes most very good cleaning agents. QA compounds are generally low in toxicity, but prolonged contact can be irritating. The quaternaries are commonly used in ordinary environmental sanitation of noncritical surfaces such as floors, furniture, and walls.

4.0 INTERMEDIATE LEVEL DISINFECTANTS

4.1 Alcohols

In the healthcare setting, "alcohol" refers to two water-soluble chemicals: ethyl alcohol and isopropyl alcohol. These alcohols are rapidly bactericidal rather than bacteriostatic against vegetative forms of bacteria (Gram + and Gram -); they also are tuberculocidal, fungicidal, and virucidal against enveloped viruses. Alcohols are not effective against bacterial spores and have limited effectiveness against nonenveloped viruses. Their cidal activity drops sharply when diluted below 50% concentration and the optimum bactericidal concentration is in the range of 60-90% solutions in water (volume/volume). The antimicrobial activity of alcohols can be attributed to their ability to denature proteins. Higher concentrations are less effective as the action of denaturing proteins is inhibited without the presence of water

Alcohols are commonly used topical antiseptics. They are also used to disinfect the surface of medical equipment. Alcohols require time to work and they may not penetrate organic material. The documented shortcomings of alcohols are that they damage the shellac mountings of lensed instruments, tend to cause rubber and certain plastic tubing to swell and harden after prolonged and repeated use and bleach rubber and plastic tiles. Alcohols are flammable and consequently must be stored in a cool, well-ventilated area. They also evaporate rapidly which makes extended exposure time difficult to achieve unless the items are immersed. Alcohol irritates tissues. They are generally too expensive for general use as a surface disinfectant.

The use of either ethyl alcohol or isopropyl alcohol in a 60-90% solution has recently gained wide acceptance in health care settings as hand antiseptics. They can be used as a reasonable substitute for handwashing as long as hands are not visibly soiled. The drying effect of alcohols on the hands can be counteracted with the addition of emollients and skin conditioning agents to the formulation. Further study is needed to determine the ideal formulation of alcohol based hand antiseptics for effectiveness.

4.2 Hypochlorites

Hypochlorites are the most widely used of the chlorine disinfectants and are available in a liquid (e.g. sodium hypochlorite) or solid (e.g. calcium hypochlorite, sodium dichloroisocyanurate) form. The most common chlorine products in are aqueous solutions of 4 to 6% sodium hypochlorite, which are readily available as "household bleach". They have a broad spectrum of antimicrobial activity, are unaffected by water hardness, are inexpensive and fast acting, and have a low incidence of serious toxicity. The exact method by which free chlorine destroys microorganisms has not been elucidated. Sodium hypochlorite at the concentration used in household bleach (4-6%) may produce skin and ocular irritation or oropharygeal, esophageal, and gastric burns. Other disadvantages of hypochlorites include corrosiveness to metals in high concentrations (>500 ppm), inactivation by organic matter, discoloring or "bleaching" of fabrics, and release of toxic chlorine gas when mixed with ammonia or acid.

Hypochlorites can eliminate both enveloped and nonenveloped viruses if used in correct dilution and contact time. They are also is effective against fungi, bacteria, and algae but not spores. Household bleach is typically diluted using 1:50 with water (1000ppm) for surface disinfection. Bleach solutions have been recommended for use in both hospitals and the community as disinfecting solutions. They are included in most recommendations for decontamination of hepatitis and AIDS viruses. Hypochlorites are also the agent of choice in disinfecting surfaces used for food preparation or in bathrooms. Organic material such as feces or blood inactivate chlorine based disinfectants, therefore, surfaces must be clean before their use. In order to obtain maximum effectiveness with chlorine based disinfectants they must remain in contact with surfaces for several minutes. Chlorine based disinfectants diluted in tap water have a limited shelf life. After 30 days such solutions stored in a polyethylene container will lose 40-50% of their concentration. Ideally solutions used for surface disinfection should be mixed fresh to ensure adequate levels of chlorine for antimicrobial activity. Chlorinated drinking water should not exceed 6 to 10 ppm of free chlorine with the lower value being in continuous flow or low volume reservoir systems.

Recent recommendations from Health Canada include ½ strength bleach (20,000 ppm) for use in disinfecting instruments or full strength (50,000 ppm) for surfaces contaminated with tissues considered infectious for Creutzfeldt-Jakob disease.

4.3 Iodine And Iodophor Disinfectants

Iodine and iodophors are well established chemical disinfectants. These compounds have been incorporated in time release formulations and in soaps (surgical scrubs). Simple iodine tinctures (dissolved in alcohol) have limited cleaning ability. These compounds are bactericidal, sporicidal, virucidal and fungicidal but require a prolonged contact time. The disinfective ability of iodine, like chlorine, is neutralized in the presence of organic material and hence frequent applications are needed for thorough disinfection. Iodine tinctures can be very irritating to tissues, can stain fabric and be corrosive. "Tamed" iodines such as surgical scrubs and surgical antiseptics generally do not irritate tissues. Besides their use as an antiseptic, iodophors have been used for the disinfection of blood culture bottles and medical equipment such as hydrotherapy tanks, thermometers, and endoscopes. Antiseptic iodophor preparations are not suitable for use as hard-surface disinfectants because of concentration differences. Iodophors formulated as antiseptics contain less free iodine than those formulated as disinfectants. Iodine or iodine-based antiseptics should not be used on silicone catheters as the silicone tubing may be adversely affected.

5.0 HIGH LEVEL DISINFECTANTS

5.1 Hydrogen Peroxide

Peroxides such as hydrogen peroxide are often used as antiseptics to clean wounds. The activity of peroxides is greatest against anaerobic bacteria. Hydrogen peroxide at high concentrations is in some cases is damaging to tissues, resulting in a prolonged healing time. It is useful for cleaning surgical sites after closure, but use sparingly to avoid penetrating suture lines, which would inhibit healing.

Stabilized hydrogen peroxides can be used to disinfect environmental surfaces. The literature contains several accounts of the properties, germicidal effectiveness, and potential uses for stabilized hydrogen peroxide in the hospital setting. Stabilized hydrogen peroxides are effective against a broad range of pathogens including both enveloped and nonenveloped viruses, vegetative bacteria, fungi and bacterial spores. Manufacturer's findings demonstrate that this solution sterilizes in 30 minutes and provides high-level disinfection in 5 minutes. This product has not been used long enough to evaluate material compatibility to endoscopes and other semicritical devices, and further assessment by instrument manufacturers should be done.

Stabilized peroxides may also be blended with iodophors or quaternary ammonia. Hydrogen peroxide is also blended with paracetic acid in high concentrations for use as a high-level disinfectant.

5.2 Gluteraldehyde

Aldehydes have a wide germicidal spectrum. Gluteraldehydes are bactericidal, virucidal, fungicidal, sporicidal and parasiticidal. They are used as a disinfectant or sterilant in both liquid and gaseous forms. They have moderate residual activity and are effective in the presence of limited amounts of organic material. Gluteraldehydes are very potent disinfectants, which can be highly toxic. Use them only as a last resort and then under trained supervision in a well-ventilated setting and with appropriate personal protective equipment.

5.3 Formaldehyde

Formaldehyde is used as a disinfectant and sterilant both in the liquid and gaseous states. Formaldehyde is sold and used principally as a water-based solution called formalin, which is 37% formaldehyde by weight. The aqueous solution is bactericidal, tuberculocidal, fungicidal, virucidal and sporicidal. Formaldehyde should be handled in the workplace as a potential carcinogen with an employee exposure standard that limits an 8 hour time-weighted average exposure to a concentration of 0.75 ppm. For this reason, employees should have limited direct contact with formaldehyde and these considerations limit its role in sterilization and disinfection processes.

A wide range of microorganisms is destroyed by varying concentrations of aqueous formaldehyde solutions. Although formaldehyde-alcohol is a chemical sterilant and formaldehyde is a high-level disinfectant, the hospital uses of formaldehyde are limited by its irritating fumes and the pungent odor that is apparent at very low levels (<1 ppm).

5.4 Ortho-phthalaldehyde

Ortho-phthalaldehyde (OPA) is a chemical sterilant similar to gluteraldehyde with similar antimicrobial activity. OPA has several potential advantages compared to gluteraldehyde. It has excellent stability over a wide pH range (pH 3-9), is not a known irritant to the eyes and nasal passages, does not require exposure monitoring, has a barely perceptible odor, and requires no activation. OPA, like gluteraldehyde, has excellent material compatibility. A potential disadvantage of OPA is that it stains proteins gray (including unprotected skin) and thus must be handled with caution. However, skin staining would indicate improper handling that requires additional training and/or personal protective equipment (PPE) (gloves, eye and mouth protection, fluid-resistant gowns). Although OPA does not smell, PPE should be worn when handling contaminated instruments, equipment, and chemicals and good ventilation should be provided. In addition, equipment must be thoroughly rinsed to prevent discoloration of a patient's skin or mucous membrane.

5.5 Peracetic Acid

Peracetic, or peroxyacetic, acid is characterized by a very rapid action against all microorganisms. A special advantage of peracetic acid is it has no harmful decomposition products (i.e., acetic acid, water, oxygen, hydrogen peroxide) and leaves no residue. It remains effective in the presence of organic matter and is sporicidal even at low temperatures. Peracetic acid can corrode copper, brass, bronze, plain steel, and galvanized iron but these effects can be reduced by additives and pH modifications. It is considered unstable, particularly when diluted; for example, a 1% solution loses half its strength through hydrolysis in 6 days, whereas 40% peracetic acid loses 1 to 2% of its active ingredients per month. It is used in automated machines to chemically sterilize medical, surgical, and dental instruments (e.g., endoscopes, arthroscopes).

5.6 Peracetic Acid and Hydrogen Peroxide

Two chemical sterilants are available that contain peracetic acid plus hydrogen peroxide (0.08 peracetic acid plus 1.0% hydrogen peroxide [no longer marketed], 0.23% peracetic acid plus 7.35% hydrogen peroxide). The bactericidal properties of peracetic acid and hydrogen peroxide have been established. Manufacturer's findings demonstrated that this product inactivated all microorganisms with the exception of bacterial spores within 20 minutes. The combination of peracetic acid and hydrogen peroxide has been used for disinfecting hemodialyzers.

5.7 Special Consideration for Creutzfeldt-Jakob Disease (CJD)

Special recommendations have been made by Health Canada for the cleaning and decontamination of instruments and surfaces that have been exposed to tissues considered infective for CJD. Any item that cannot be flooded or immersed in solution should be incinerated.

Contaminated instruments should be thoroughly cleaned to remove any organic material, immersed in a 1N solution of sodium hydroxide (NaoH) or ½ strength bleach solutions (20000 ppm) for 1 hour, rinsed well, and then placed in a water bath and sterilized at 121°C for one hour. Hard surfaces should be cleaned to remove any visible soil, then flooded with 2N NaOH or undiluted bleach (50000 ppm) for 1 hour, then mopped up and rinsed with water.

Any personnel handling NaOH solution/ bleach solution must use appropriate PPE.

6.0 APPENDICES

6.1 Appendix 1 - Classes of Organisms Ranked in order of Susceptibility to Disinfectants

Least Susceptible	**Bacteria with Spores** (*B. subtitles, C. tetani, C. difficile, C. botulinum)* Protozoa with Cysts (*Giardia lablia, Cryptosporidium parvum)*
	Mycobacteria (*M. tuberculosis, M. avium-intracellulare, M. chelonae*) **Non-Enveloped Viruses** (*Coxsachievirus, poliovirus, rhinovirus, Norwalk-like Virus, hepatitis A virus*)
	Fungi (*Candida species, Cryptococcus species, Aspergillus species, Dermatophytes*)
Most Susceptible	**Vegetative Bacteria** (*Staphylococcus aureus, Salmonella typhi, Pseudomonas aeruginosa, coliforms*) **Enveloped Viruses** (Herpes simplex, varicella-zoster virus, cytomegalovirus, measles virus, mumps virus, rubella virus, influenza virus, influenza virus, respiratory syncytial virus, hepatitis B & C viruses, hantavirus and human immunodeficiency virus)

Low Level Disinfectant

Intermediate Level Disinfectant

High Level Disinfectant

Chemical Sterilant

6.2 Appendix 2 - Disinfectant Uses, Advantages and Disadvantages

Disinfectant	Uses	Advantages	Disadvantages
Alcohols	Intermediate level disinfectant Disinfect thermometers, external surfaces of some equipment (e.g., stethoscopes). Equipment used for home health care Used as a skin antiseptic	Fast acting No residue Non staining	Volatile Evaporation may diminish concentration May harden rubber or cause deterioration of glues Intoxicating
Chlorine	Intermediate level disinfectant Disinfect hydrotherapy tanks, dialysis equipment, cardiopulmonary training manikins, environmental surfaces. Effective disinfectant following blood spills; aqueous solutions (5,000 ppm /1:10 bleach) used to decontaminate area after blood has been removed; sodium dichloroisocyanurate powder sprinkled directly on blood spills for decontamination and subsequent cleanup. Equipment used for home health care. Undiluted bleach can be used as a high level disinfectant.	Low cost Fast acting Readily available in non hospital settings	Corrosive to metals Inactivated by organic material Irritant to skin and mucous membranes Use in well-ventilated areas Shelf life shortens when diluted (1:9 parts water)

Formaldehyde	Very limited use as chemisterilant Sometimes used to reprocess hemodialyzers Gaseous form used to decontaminate laboratory safety cabinets	Active in presence of organic materials	Carcinogenic Toxic Strong irritant Pungent odour
Glutaraldehydes	2% formulations — high level disinfection for heat sensitive equipment Most commonly used for endoscopes, respiratory therapy equipment and anesthesia equipment	Noncorrosive to metal Active in presence of organic material Compatible with lensed instruments Sterilization may be accomplished in 6-10 hours	Extremely irritating and toxic to skin and mucous membranes Shelf life shortens when diluted (effective for 14-30 days depending on formulation) High cost Monitor concentration in reusable solutions
Hydrogen peroxide	Low level disinfectant (3%) Equipment used for home health care Cleans floors, walls and furnishings High level disinfectant (6%) Effective for high level disinfection of flexible endoscopes Foot care equipment Disinfection of soft contact lenses Higher concentrations used as chemisterilants in specially designed machines for decontamination of heat sensitive medical devices Stabilized hydrogen peroxide (0.5%) is used a high level surface disinfectant.	Strong oxidant Fast acting Breaks down into water and oxygen	Can be corrosive to aluminum, copper, brass or zinc Surface active with limited ability to penetrate

Iodophors	Intermediate level disinfectant for some equipment (hydrotherapy tanks, thermometers) Low level disinfectant for hard surfaces and equipment that does not touch mucous membranes (e.g., IV poles, wheelchairs, beds, call bells)	Rapid action Relatively free of toxicity and irritancy	Note: Antiseptic iodophors are NOT suitable for use as hard surface disinfectant Corrosive to metal unless combined with inhibitors Disinfectant may burn tissue Inactivated by organic materials May stain fabrics and synthetic materials
Peracetic acid	High level disinfectant or sterilant for heat sensitive equipment Higher concentrations used as chemical sterilants in specially designed machines for decontamination of heat sensitive medical devices	Innocuous decomposition (water, oxygen, acetic acid, hydrogen peroxide) Rapid action at low temperature Active in presence of organic materials	Can be corrosive Unstable when diluted
Phenolics	Low/intermediate level disinfectants Clean floors, walls and furnishings Clean hard surfaces and equipment that does not touch mucous membranes (e.g., IV poles, wheelchairs, beds, call bells)	Leaves residual film on environmental surfaces Commercially available with added detergents to provide one-step cleaning and disinfecting	Do not use in nurseries Not recommended for use on food contact surfaces May be absorbed through skin or by rubber Some synthetic flooring may become sticky with repetitive use
Quaternary ammonium compounds	Low level disinfectant Clean floors, walls and furnishings Clean blood spills	Generally non- irritating to hands Usually have detergent properties	DO NOT use to disinfect instruments Non-corrosive Limited use as disinfectant because of narrow microbiocidal spectrum

Source: Handwashing, Cleaning, Disinfection and Sterilization in Health Care. CCDR 24S8, December 1998: Health Canada.

6.3 Appendix 3 - Directions for Preparing and Using Chlorine-based Disinfectants

Product	Intended use	Dilution	Available chlorine
Household bleach (5% sodium hypochlorite with 50000 ppm)	Cleanup blood spills[1]	1 part bleach to 9 parts water	0.5% 5000 ppm
	Surface Disinfection[2]	1 part bleach to 50 parts water	0.1% approx. 1000 ppm
	Food Surfaces[3]	1 part bleach to 200 parts water	0.025% approx. 200 ppm
	Instruments/surfaces contaminated with tissue infective for CJD[4]	1 part bleach to 1 part water / undiluted	2.5 to 5% 20000 to 50000 ppm
Sodium dichloroisocyanurate (NaDCC) powder with 60% available chlorine	Cleanup blood spills	Dissolve 8.5 g in one litre of water	0.85% or 5000 ppm
Chloramine-T powder with 25% available chlorine	Cleanup blood spills	Dissolve 20 g in one litre of water	2% or 5000 ppm

1. Contact time at least 10 minutes.
2. Contact time at least 5 minutes. Wet surface with bleach solution and allow drying.
3. Contact time at least 2 minutes. During gastroenteritis outbreaks 1:50 dilution is recommended.
4. Contact time 1 hour, then rinse. Instruments require sterilization following disinfection.

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BC Centre for Disease Control

Selection and Use of Disinfectants

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